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Uncovering the wage differential between formal and informal jobs: Analysis from the Colombian Caribbean region

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Abstract

The paper aims to assess the wage differential that would induce workers to switch between informal and formal sectors, analysing the informal labour market in the Colombian Caribbean region. Relying on the theory of equalising differences, we uncover which workers perceive the highest utility from holding a formal job. Our research sheds light on how workers derive utility from formal and informal job sectors' benefits and to which extent informal workers are willing to accept a lower (or higher) wage to get a job in the formal sector. We also analyse the factors increasing the likelihood to seek employment in the formal sector. Results suggest that, on average, informal workers in the study region are willing to switch to a formal job only if they are offered a salary higher than their current income but are also willing to accept a salary slightly lower than the legal minimum wage in the formal sector. Finally, perceptions of benefits from formal and informal jobs vary with the socio-economic characteristics of individuals, especially by education level and previous work experience.

Keywords: labour informality, Colombian Caribbean region, income, hidden economy.

JEL Classification: E24, E26, J64

1. Introduction

One of the biggest challenges in Latin American economies is how to reduce informal employment while decreasing unemployment rates, which are undesired, but frequent, outcomes of emerging and developing economies. Experts often define informality as those economic activities that are not officially reported. Hence, they are not guarded by the regulatory and legal framework of the state in which they are developed (ILO, 2013; Williams et al., 2016; Bernal, 2009; Perry et al., 2007).

Informal employment leads to a variety of complications. On one side, these jobs lack the formal regulation and social benefits that protect the worker against adverse labour-related conditions and external shocks such as illness, elderly or personal calamities (Perry et al., 2007; Andrews et al., 2011). For instance, informal employees usually do not enjoy certain legal labour benefits, such as paid vacations or maternity leaves (Martínez et al., 2017; Williams & Lansky, 2013). On the other side, the informal labour market is often characterised by low productivity, reduced capital accumulation, weak growth perspectives, and few incentives to invest in human capital, which in turn has adverse effects on economic development (Perry et al., 2007; The World Bank; 2011). Informality is also associated with poor tax revenues and social security contributions, lowering the financial capacity of governments to provide public goods and services (The World Bank, 2011; Andrews et al., 2011).

It is of particular concern when informal workers use public space to develop their economic activities (i.e. street vendors, merchants and unregulated drivers offering informal passengers transport services), as they generate negative externalities on the formal sector and local urban planning. For instance, these types of informal activities are known for hindering mobility of vehicles and pedestrians (Martínez et al., 2017; Cervero & Golub, 2007), thus increasing traffic crashes (Márquez et al., 2018) and generating noises, visual and air pollution (Cervero & Golub, 2007). Furthermore, informal activities engage in unfair competition with formal enterprises since they usually do not have any land-related costs and do not pay taxes for public space occupation.

Despite these concerns, informal jobs account for a significant share of the total employment in emerging countries (Auerbach et al., 2018; Günther & Launov, 2012). In November of 2019, the proportion of informal workers in Colombia was 47.7% of the total employed population (DANE, 2019). The informality rate must be fought by encouraging formalisation and job creation; however, this is not a simple task. In order to develop an optimal policy package that successfully incentivises the shifting toward formality, we must first inquire into what drives informality (The World Bank, 2011).

The paper seeks to investigate the determinants of employment informality in the Colombian Caribbean region, a context characterised by high poverty levels. Specifically, the research aims to understand informal workers' preferences for formal and informal job amenities. The data used was collected through two types of surveys. The first one, an informal employees survey, aimed to gather information on the willingness to shift to formal jobs considering a stated preference experiment in the form of a bidding game. The second, a household survey, aimed to characterise all family members' labour, social and economic situations, and identify the main differences between formal and informal workers.

We assess the compensating wage differential that makes workers indifferent between working in the formal and informal sectors. For this purpose, we propose an approach considering the individual choice for formal-informal labour based on a model of equalising differences for job amenities (Rosen, 1986), and Roy's model for job choice (Roy, 1951). We also inquire whether individuals' preferences are consistent with the likelihood of being informally employed. We investigate whether the individuals who derive the lowest utility from working in the informal

sector are more likely to be informally employed or less likely to look for opportunities in the formal market.

Our research contributes to the informal-formal wage differential literature as it bypasses the delicate and challenging wage differential identification problem, widely reported in the literature (Kahyalar et al., 2018; Oaxaca and Ransom, 1999). In most settings, wage differentials between formal and informal workers do not identify either sector productivity differentials (Roy's component) or compensating wage differentials (Rosen's component). To pin one of these components down, strong assumptions usually must be imposed. Because our data has direct self-reported measures of compensating wage differentials, it bypasses the confounding issues that are caused by equilibrium relationships that determine the wages of formal and informal workers. In sum, a relevant methodological contribution of this research is that the unique nature of the survey allows circumventing an otherwise difficult and delicate identification problem when estimating compensating wage differentials.

The organisation of the paper is as follows. After this introduction, Section 2 presents a brief literature review. Section 3 aims to contextualise the reader about the socio-economic context of the Colombian Caribbean region. Section 4 introduces the data collection process and sample statistics. Section 5 describes the modelling technique implemented and principal results, while section 6 provides a brief discussion. Finally, section 7 exposes the main conclusions.

2. The faces of the informal labour market: A literature review

Diverse studies have empirically addressed the analysis of the informal market using aggregate and disaggregate approaches. The former is used principally to study the relationship between macro-level data, such as quality of institutions, economic growth, and informality. On the other hand, disaggregate approximations are helpful to focus on the rationale behind the individuals' behaviour. Given the objectives of the investigation, we will focus on study cases applying a disaggregate approach. This section briefly discusses the empirical evidence of informal workers' socio-economic profile and the intrinsic and context-related factors influencing their decision to participate or not in the informal sector.

2.1 *Socio-economic profile of informal workers*

Although the characteristics of informality might vary across locations, there is a broad consensus that the probability of belonging to this working cluster is higher for vulnerable and minority groups, as well as for those with a lower educational and income background (Martínez et al., 2017; Başbaya et al., 2018, Chen, 2012; ILO, 2014; Kanbur et al., 2013). In fact, education level is a relevant factor. Informal workers face lower returns from their education and suffer educational mismatches, putting them at a disadvantage compared to their formal counterparts (Herrera-Idárraga et al., 2015).

Multiple studies have found a U-shape relationship between age and informality; the youth and elderly are more likely to belong to this sector, especially in developing countries (Başbaya et al., 2018; Galvis, 2012, Perry et al. 2007; Kanbur et al., 2013). Moreover, a large amount of evidence supports the notion that women are more susceptible to participating in this labour market (Başbaya et al., 2018; Galvis, 2012; ILO, 2014).

2.2 *The nature and motivations of informal employment*

The literature addressing the motivations behind informality may be divided into two main groups (Cichockia & Tyrowicza, 2010; Günther & Launov, 2012; Williams C, 2015; Bosch et al., 2014; Perry et al., 2007). Based on the framework of competitive labour market theories (Gün-

ther & Launov, 2012), the first group argues that after a cost-benefit analysis, informal workers and employers deliberately choose to labour in this sector to avoid regulations, taxations and other costs associated with formality. In other words, workers optimally self-select into informal activities because of better pay, flexibility, and no regulation.

For instance, after conducting a study to characterise the profile and dynamics of street vendors in the downtown of Cali, Colombia, Martínez et al. (2017) concluded that street vendors deliberately choose to work in the informal sector as it grants them higher utility. The authors found that street vendors in Cali received a higher income than average citizens. Despite working longer hours, they were generally satisfied with their business and had no intentions of formalising or looking for formal job opportunities.

The second group considers informality because of the labour market's segmentation. Unskilled, marginal, and vulnerable workers are driven to this sector due to the numerous barriers they face when trying to access the formal labour market. In other words, informal workers are just segmented workers waiting for scarce formal jobs. Under this framework, informal workers desire to work in the formal sector but are unable to find jobs. Considering this, informality can be seen as a safety net for the poor, and a means to reduce poverty in extremely adverse situations (Chen, 2012).

On the other side, some authors argue that the informal labour market has a heterogeneous structure, being it a product of both the market segmentation and cost-based decisions (Günther & Launov, 2012; Fields, 2005; Williams, 2015). Authors in this group claim that informality has a dualist structure where voluntary and involuntary employment coexist.

According to the Theory of Compensating Wage Differentials, a trade-off exists between wages and disagreeable job characteristics. For instance, an informal worker who values stability tends to accept a stable formal with less pay (Smith, 1979). Furthermore, some studies have addressed the existence of wage differences between formal and informal jobs. In Turkish, Kahyalar et al. (2018) investigated if a wage difference exists between formal and informal sectors. Their results reveal a wage gap between the two sectors, and that education and experience are key determinants of earnings. They also found that firms are willing to pay a compensating differential to attract qualified workers. Herrera-Idárraga et al. (2016) studied the role of education and informality in regional wage differentials in Colombia. The research revealed remarkable spatial heterogeneity in the wage return to individuals' characteristics. Regional heterogeneity in returns to education is especially intense at the top of the wage distribution, while heterogeneity in the informal pay penalty is more relevant at the bottom.

2.3 *Influence of external factors on the decision to work informally*

There is extensive evidence proving that external inherent-to-societies factors can influence the decision to work in the informal market. Besides studying the perceptions and characteristics of workers, it is also imperative to analyse the contextual background where they live. Some examples of these factors are the quality and features of institutions, such as tax morale or the legal framework.

Some researchers have concluded that access to formal opportunities and transport costs profoundly influence informality rates. For instance, if commuting costs are too high, workers might be discouraged from labouring at formal employments and opt for informal jobs near their homes (Moreno-Monroy & Posada, 2018; Boisjolya et al., 2019). On the other hand, some argue that lowering taxes may positively impact informality rates (Auriola & Warltersb, 2005; Fugazzaa & Jacques, 2003; Cruces et al., 2018). However, several studies have found no empirical evidence proving the validity of this hypothesis (Ulyssea, 2010; Williams, 2015; Friedman, 2000; Galiani et al., 2017). Nevertheless, these studies typically agree that higher tax morality

levels, severance payments and enforcement are related to lower informality levels (Ulyssea, 2010; Kus, 2010; Flórez, 2017).

In addition, there is some evidence that social programs can discourage formalisation (Garganta & Gasparini, 2015; Ferreira & Robalino, 2010; Gonzalez-Rozada & Ruffo, 2016; Bloeck et al., 2019) since they create perverse economic incentives for remaining in these sectors. Bosch et al. (2014) found that the "Seguro Popular" program in México, which offered free health insurance to informal workers, had a negative effect on the number of employers and employees formally registered. They suggest that the positive gains of expanding health coverage should be contrasted with allocating labour away from the formal sector. In the case of Colombia, previous studies (Martínez et al. 2017; Saavedra-Caballero & Londoño, 2018) suggest that introducing the subsidised health system providing free healthcare to vulnerable populations has encouraged informality; although only citizens with a monthly income inferior to the minimum wage can be participants of this program, many informal workers belong to this system despite having sufficient economic resources.

3. Socio-economic context: The Colombia Caribbean region

The Colombian Caribbean region, located in the north of the country, has around 10.8 million inhabitants, with 28% living in rural areas[1]. The economy in the region is mainly based on natural resources exploitation (i.e., coal and natural gas), agricultural production (i.e., bananas, oil palm, tropical fruits, livestock farming) and tourism. The region is crossed by the Magdalena River, the most important in Colombia (Berrío et al., 2019).

The Caribbean region has a lower educational level compared to the national average. According to the national census of 2018[2], 49% of the population had completed secondary education, and only 9.2% had pursued a vocational training or university degree, whilst the national averages were 52.8% and 13.9%, respectively. Additionally, the illiteracy rate in the region was 8.3%, while the national average was 5.8%. The GDP per capita of the region is about 68% of the rest of Colombia. There are 2.1 million workers in the region, and 57.7% are informal - 10 percentual points higher than the national informality rate (DANE, 2019).

With these unfavourable indicators, it is not surprising that industrial and economic activity development is low. The unemployment and informality rates are of particular concern, especially in non-capital municipalities, which is the focus of this study. According to DANE (2019), these rates were 13% and 57.7% in the Caribbean region, respectively. In the region, informal employment is widely accepted. The most common informal occupations among the economically active population are motorcycle-taxi drivers and street vendors.

In sum, the Colombian Caribbean region is a typical case of low development areas common in Global South countries, with a limited capacity for creating formal or high-quality jobs, pushing the labour market towards informality. The socioeconomics of the region is typical of less developed communities in Latin America and the Caribbean.

4. Data description

The data used to complete this paper was collected through two types of surveys conducted by November 2017. The first one referred to an individual informal employee survey conducted on 608 individuals and aimed to gather information to identify informal workers' socio-economic

1 Population projections by the National Department of Statistics (DANE). https://www.dane.gov.co/index.php/estadisticas-por-tema/demografia-y-poblacion/censo-nacional-de-poblacion-y-vivienda-2018

2 National Department of Statistics (DANE). https://www.dane.gov.co/index.php/servicios-al-ciudadano/311-demograficas/censo-2018

profile and working conditions, as well as the willingness to shift to formal jobs considering a stated preference experiment in the form of a bidding game. The second, the household survey, aimed to characterise all family members' labour, social and economic situations, and identify the main differences between formal and informal workers. The sample size was estimated considering a 95% confidence level and a 5% error[3]. The second survey's sample consisted of 491 households, gathering information from 774 working persons. However, after cleaning up the databases, the individual and household survey sample used to estimate the econometric models (see section 5) decreased. The sample sizes were estimated considering a 95% confidence level and a 5% error. The household survey was used to characterise the profile of formal and informal workers (see Section 5.1). On the other hand, the individual survey served to estimate the wage differential between formal and informal jobs (see Section 5.2), as well as to evaluate the probability of informal workers seeking labour in the formal sector (see Section 5.3).

For practical purposes, we define formal workers as those who contribute to social security schemes and are not engaged in illegal or uncontrolled activities (e.g., street vendors or motorcycle-taxi drivers). This is a straightforward strategy to measure informality in the Colombian context since it captures its definition well (Bernal, 2009; Galvis, 2012). Note that formal workers earn the minimum legal salary or more.

In the context of the survey, individuals were interviewed considering gross income. Net income after taxes -and other deductions- was not involved. They perceived the framing of the question as to the "gross wage". We must point out that the formal wage in Colombia also includes additional benefits (not only deductions). Examples are the transportation subsidy and payment of service premiums.

The following subsections present a summary of the main results from the household and individual survey. Table A1 and Table A2 in the appendix summarise these results by presenting the main descriptive statistics from the survey, focusing on the covariates used in our empirical models (section 5).

4.1 *Individual informal employee survey*

Overall, we found that most informal employees working in public spaces are men; only 17% of the surveyed population were females. Around 43% of the sampled population were younger than 35 years old. As expected, the education level was low; only 8% of the individuals pursued vocational training or university degree, and almost 44% did not complete high school.

We found three categories of informal workers in the study zone: motorcycle-taxi drivers (59%), street vendors (25%) and others (16%). These are the most visible forms of informality, generating most of the associated externalities. Motorcycle-taxi drivers are usually young people; about 85% are younger than 45 years old. On the other hand, street vendors are generally older people since 60% were older than 45 years old. Street vendors are less educated than motorcycle drivers; around 64% of the latter graduated from high school, while this number was only 38% for the former. However, this relationship can be explained considering that education level decreases with age. For instance, 66% of the people younger than 45 years old graduated from high school, while this number among the rest of the population was only 31%.

The workday among informal workers is long and strenuous. To make enough earnings to cover their expenses, around 76% of workers work more than 48 hours per week, under extreme weather conditions with temperatures above 30°C. Additionally, more than half of the population has been practising their current occupation for more than 11 years. It is also remarkable that their earnings are relatively low; around 64% had a monthly income inferior

3 A detailed description of the survey design and the data (in Spanish) is presented in the supplementary online appendix available at *https://www.dropbox.com/sh/nhjvf8ff2in0kvc/AAA4zb629lAIq7wChGn_j5uUa?dl=0*.

to 800,000 COP (242.42 USD)[4], and 12% earned less than 400,000 COP (121.21 USD), while the minimum monthly wage was 820,857 COP (248.74 USD) at the time.

Only 19% of the sample had worked in a formal job, while 35% had looked for a job with a stable salary. Near 78% of the sampled individuals stated that they do not intend to formalise their business, and 47% who have tried have not succeeded because of lack of resources. Additionally, around 19% of the workers had some debt at the time the survey was performed. Of them, about half paid their financial compromise with "payday loans," sponsored by non-official or illegal lenders characterised by high-interest rates.

4.2 *Household survey*

The household survey found that, in the study region, the average household size was 4.9 persons per home. On average, in each home there were 3 adults and 2 children. About 63% of adults had an occupation or were engaged in a determined economic activity. The survey did not collect information about child labour. Around 63% of the workforce were men, and 66% were older than 35. Of those working, only 13% were formal workers as they contributed to social security schemes. On average, as expected, those who did not contribute to social security schemes had a lower educational level. Only 15% reported having a vocational training or university degree, while about half did not have a high school diploma. In comparison, these numbers among contributors were 82% and 10%, respectively.

In Colombia, households are categorised into six socio-economic strata according to the physical conditions of the house, where strata 1 is the lowest and strata 6 is the highest. This index correlates with household income and vehicle ownership (Cantillo-Garcia et al., 2019). All the surveyed population in the sample belonged to the lowest strata: 86% of homes were strata 1, and the rest were strata 2. Consequently, it is not surprising that the household income in the sample is low; about 67% of homes received compensation lower than the minimum wage, and 28% earned less than half of the monthly minimum legal salary.

5 Empirical analysis and modelling

This chapter describes the modelling approach implemented and the results obtained for each inquiry. First, we descriptively analyse the socio-economic profile of informal workers. Second, we estimate the compensating wage differential that would make informal workers indifferent between formal and informal sectors. Then, we analyse what type of informal workers are most likely to seek formal job opportunities. The results obtained are used to discuss the main motivations to be informally employed.

5.1 *Characterising the profile of formal and informal workers*

As a descriptive exercise, using the data from the household survey, we developed a logistic regression model to characterise the socio-economic profile of informal and formal workers in our case study. The logistic regression was estimated using the command *xtlogit* from STATA, and the independent variables were selected after reviewing the literature on informal worker's socio-economic determinants[5]. We introduced a random-effects model to correlate individuals belonging to the same household. Table 1 presents the socio-economic attributes analysed and the model's results, together with the estimates of Average Marginal Effects (AME)[6].

4 1 USD 3,300 COP when data was collected

5 Refer to section 2.1.

6 Average Marginal Effects were calculated using the command *margins* in STATA

We found that the socio-economic profile of informal workers from the Caribbean region of Colombia is coherent with the literature. As shown in Table 1, our results portray a negative correlation between the level of education and the likelihood of being informally employed. Using as the base group the individuals who did not finish high-school education, we found that, in our case study, obtaining a high school diploma decreased, on average, the individual probability of belonging to the informal sector by 0.114. In addition, that probability is further reduced by 0.318 and 0.430 if individuals obtain vocational training and university degrees, respectively.

Table 1. Profile of informal workers.

Variable	Description	Coef.	t-stat	AME
Male	1 if male	0.33	0.80	0.017
Logarithm of age	Logarithmical transformation of age	-3.76	-3.91***	-0.188
High school education	1 if the maximum level of education achieved is a high school diploma	-2.91	-3.90***	-0.114
Vocational training education	1 if the maximum level of education achieved is a vocational training diploma	-5.21	-4.47***	-0.318
University education	1 if the maximum level of education achieved is an undergraduate degree	-6.18	-4.91***	-0.430
Number of children	Number of children below the age of 12 living in each household	-0.52	2.18**	-0.026
Strata 2	1 if belong to the highest reported level of socio-economic strata (Strata 2)	-1.73	-2.51**	-0.105
Car ownership	1 if has a car	-3.04	-1.94*	-0.220
Motorcycle ownership	1 if has a motorcycle	-1.04	-2.18**	-0.053
Constant		18.15	4.25***	
Log-likelihood	-192.76			
Number of households	471			
Number of individuals	736			

*** p-valuee<0.01, ** p-valuee<0.05, * p-valuee<0.1

Our results also show that the odds of labouring in the informal sector decrease with age. The average marginal effects estimation shows that, on average, a 1% increase of Colombian Caribbean workers' age decreases the probability of labouring in the informal sector by 0.00188. The negative relationship between age and informality can be explained if it is taken into consideration that the youth are in a disadvantaged position in terms of experience, economic resources, social capital, and access to credit.

We also include the income-related variables socio-economic strata and ownership of motor vehicles. In general, we found that individuals living in households belonging to the higher socio-economic strata and those owning a car, or a motorcycle, have a lower probability of being informally employed. This positive relationship between household income and informality has been encountered in different studies (Perry et al., 2007; ILO, 2014). However, these results must be taken with caution, considering that these income-related variables may be endogenous to our model given the simultaneity between income and the sector to be formally employed. It is true that more impoverished individuals face higher barriers, and thus probability, to participate in the formal sector. It is also true that formal job holders receive, on average, a higher wage than their informal counterparts; thus, being formally employed could increase their household income. However, to study whether the remaining variables were exogenous to this potential endogeneity, we estimated the model without income-related variables (see table A3 in appendix). By doing this, we found that the estimated coefficients of education and age variables did not significantly change in terms of magnitude, supporting the exogeneity of these variables.

Nevertheless, we acknowledge that the model is limited as it does not adequately consider potential self-selection problems; workers might select themselves to work in the formal or the informal sector due to unobservable factors (Heckman and Sedlacek, 1985). This impedes fully understanding the causality direction of our results, especially for the education variables: Does education increases the probability of being informally employed or formal workers choose to be more educated? However, given that education is usually determined by parents' choice and other external-to-the-individual factors, especially elementary and high education, we can argue that this variable is unlikely to be affected by the self-selection problem.

5.2 *Estimating the compensating wage differential*

This section analyses which workers attain the greatest and lowest utility of holding a formal sector job. How do socio-economic characteristics influence the value that individuals give to formal sector attributes? To achieve this, we develop a framework to estimate the compensating wage that must be paid to informal workers to make them indifferent between working in the formal and informal sectors. The input data used for this purpose came from the individual's informal employee survey.

5.2.1 Understanding the wage differential between formal and informal sectors

The theory of equalising differences (Rosen, 1986; Brown, 1980) provides theoretical support to study the observed wage differentials required to equalise the total monetary and non-monetary advantages or disadvantages between work activities. The theory recognises that wage differentials may be required to equalise the total monetary and non-monetary advantages and disadvantages among alternative employments (Cartwright and Wooders, 2001). According to Rosen (1986), average earnings should be higher in the informal sector to compensate for the non-monetary benefits granted to formal workers. If the value of the benefits is nonnegative, earnings in the informal sector should be at least as high as formal salaries to compensate for the lack of benefits. In addition, Roy's model (Roy, 1951) explains job choice and its consequences for the distribution of earnings when individuals differ in their occupation-specific skills. This framework is a prototype for a self-selection model in the labour market, where a specific case is the formal-informal job choice.

In most labour economic models, the formal sector wage gap, that is, the wage differential between formal and informal sector for a given worker is a combination of two terms: the effect of informality on the firm's profit function and the effect of informality on the worker's utility (Jales and Zhengfei, 2020). The first is a Roy-type of productivity differences (Roy, 1951; Taber and Vejlin, 2020): Workers might be more productive (from the firm's perspective) if assigned to a formal or informal sector depending on the current level of taxes and the costs of hiding economic activity. The second is a Rosen-type of component (Rosen, 1986): To the extent that workers derive utility from formal sector benefits such as job stability, better job amenities, paid vacations and all other mandated benefits associated with formal employment, they might be willing to accept a lower wage, *ceteris paribus*, to get a job in the formal sector. In contrast, if workers derive utility from informal sector benefits such as flexibility, free health services, and less taxation, they will only accept switching to the formal sector for a greater wage.

5.2.2 Econometric approach

The value of the compensating wage differential is a function of the workers' preferences. Taking a neoclassical microeconomic stand, we assume that the workers' differential utility between the formal and informal sector depends on the monetary and non-monetary attributes of each sector, and individual's characteristics, including socio-economic and other non-visible latent factors; particularly:

$$U_{s,i} = f(w_s, X_s, Z_i, L_i) \quad [1]$$

Where $U_{s,i}$ is the utility attained by individual i by working in sector s(Formal $\wedge$ Informal $\in s$). w_s depicts the wage that workers receive from the sector s, whilst X_s is a vector portraying the non-monetary and non-pecuniary amenities of the sector s which workers value beyond the wage. In addition, Z_i and L_i are a vector of socio-economic characteristics and unobservable intrinsic subjective characteristics of the individual i, respectively, which explain any perceived heterogeneity in tastes and preferences. If the utility function has a linear form, we obtain:

$$U_{s,i} = \delta w_s + \beta X_s + \alpha_s Z_i + \gamma_s L_i \quad [2]$$

Where δ and β are the marginal utility of income and sector's non-pecuniary characteristics, respectively. Parameters α_s and γ_s portray the change in the marginal utility of sector s depending on the individual's characteristics. Building upon the random utility theory (Train, 2009), we assume that a normally distributed random term $\varepsilon_{is} \sim N(0, \sigma)$ represent all unobservable determinants of the utility, including non-measurable intrinsic individual characteristics L_i.

$$U_{s,i} = \delta w_s + \beta X_s + \alpha_s Z_i + \varepsilon_{is} \quad [3]$$

Considering the utility form in Eq. [3], and assuming $s = 1$ for formal sector and $s = 0$ for the informal sector, the compensating wage cw_i differential for individual i can be estimated considering that is the payment to be made by the individual in order to be indifferent between working in the formal and informal sector:

$$U_{0,i}(w_0, X_0, Z_i, L_i) = U_{1,i}(w_0 - cw_i\,, X_1, Z_i, L_i)$$

$$\delta w_0 + \beta X_0 + \alpha_0 Z_i + \varepsilon_{i0} = \delta(w_0 - cw_i\,) + \beta X_1 + \alpha_1 Z_i + \varepsilon_{i1}$$

$$cw_i = \frac{\beta}{\delta}(X_1 - X_0) + \frac{\alpha_1 - \alpha_0}{\delta} Z_i + \varepsilon_{i1} - \varepsilon_{i0} \quad [4]$$

As the compensating wage cw_i is a monetary measure of the value that an individual i, belonging to a group Z_i, attach to formal and informal sector's differences in amenities $(X_1 - X_0)$, it has a likewise interpretation to the willingness to pay and willingness to accept concepts. As some workers attach a higher utility from the informal sector and others from the formal sector, the compensating wage differential can be positive or negative. A positive (negative) compensating wage cw_i means that the individual attains a higher utility for the formal (informal) sector. Given that the initial state of individuals is working in the informal sector, a positive compensating wage $(cw_i > 0)$ can be interpreted as the willingness to pay (WTP) of the individual to change to the formal sector; likewise, a negative compensating wage $(cw_i < 0)$ can be interpreted as the willingness to accept (WTA) to change to the formal sector. Nevertheless, assuming no loss aversion and absence of income effects, WTP and WTA estimates are in principle equal. Therefore, taking caution of the sign of the coefficients and the direction of change of the covariates, the coefficients $\frac{\alpha_1 - \alpha_0}{\delta}$ and $\frac{\beta}{\delta}$ can be interpreted as either the marginal WTP or WTA for each covariate. For instance, a positive (negative) $\frac{\beta}{\delta}$ depicts the marginal WTP (WTA) for a positive change in $X_1 - X_0$, but also depicts the marginal WTA (WTP) for a negative change in $X_1 - X_0$. Likewise, a positive (negative) $\frac{\alpha_1 - \alpha_0}{\delta}$ portrays both the increase in each socio-economic group's WTP (WTA) and the decrease in each socio-economic group's WTA (WTP) with respect to a reference group. To avoid confusion when interpreting results, all the coefficients will be analysed in terms of marginal WTP.

We used the contingent valuation method to estimate Eq. [4]. The contingent valuation question was: "Would you be willing to drop your business for a stable job if the salary is…?" since stable earnings are perceived as one of the main benefits of being formally employed.

Although informal workers do not contribute to social security schemes, they are part of the subsidised health system of Colombia. In most cases, they are beneficiaries of "*familias en acción*", a conditional cash transfer program, and the subsidised health insurance regime (Tovar and Urrutia, 2017). For this reason, in terms of social security, they may have little motivation to seek a formal sector job, except for the retirement pension.

We did not inquire about the possibility of informal workers formalising their business and keeping their status as self-employed because most of them earn a salary lower than the minimum legal wage. In addition, their low savings, capital, and income impede them from accessing credit opportunities that could allow them to finance the formal registration of their business.

We employed a downwards iterative bidding game[7]. Initially, individuals were asked if they would be willing to change to a stable job for an initial bid (Bid_1). If they 'accept' Bid_1, the survey concludes, if they 'reject' it, a higher bid is offered (Bid_2). If they did not 'accept' Bid_2, a higher bid was asked again (Bid_3), and the bidding game continued until the highest bid was reached. The game resulted in an interval where w_1, the salary for which the individual would be willing to change to the formal sector, lies (Cantillo et al., 2020).

Four levels of the bid were proposed, resulting in four intervals where the respondent's minimum salary for which he would be willing to change to the formal (w_1) lies: lower than 800,000 COP (242.42 USD), between 800,000 COP and 1,200,000 COP (363.64 USD), between 1,200,000 COP and 1,600,000 COP (484.85 USD), and higher than 1,600,000 COP. Preliminary, we found that half of the respondents would change their job if they received a salary of 800,000 COP, 37% said they would if their monthly wage was between 800,000 COP and 1,200,000 COP, 12% would switch sectors if they received an income higher than 1,200,000 COP and lower or equal than 1,600,000 COP. Only 1% of individuals stated that they required a salary higher than 1,600,000 COP to accept a formal job.

Considering that the compensating wage cw_i is the difference between the wage in the informal sector w_0 and the formal sector wage w_1 which makes the individual indifferent, and Bid_c is the chosen bid, we can obtain the ranges in which cw_i lies:

$$Bid_{c-1} \leq w_1 < Bid_c$$

$$Bid_{c-1} \leq w_0 - cw_i < Bid_c$$

$$w_0 - Bid_c < cw_i \leq w_0 - Bid_{c-1}$$

$$cw_{i,\inf c} < cw_i \leq cw_{i,\sup c} \qquad [5]$$

5.2.3 Results

Since the dependent variable of our model is an interval where the compensating wage lies, we used an interval regression model to estimate the parameters shown in Eq. [4]. The estimation was made using the command *intreg* in STATA. Table [2] presents the estimated results (N= 527). Model 3 has the highest goodness of fit measured with the AIC and the BIC (Greene, 2018), while it is the most parsimonious.

Except for the attribute numbers of hours worked, the variables included portray the individual's characteristics (vector Z_i in Eq. [4]). The coefficients of the socio-economic variables are interpreted as the marginal compensating wage of these socio-economic groups, *ceteris paribus*. On the other hand, the attribute number of hours worked is related to the characteristics of the choice's alternatives, working on the informal sector or not (vector X in Eq. [4]). This variable corresponds to the difference between 48 hours, the legal full-time working week schedule

7 A more detailed explanation is provided in the supplementary online appendix.

in Colombia, and the weekly hours worked under the respondent's current informality scheme. Therefore, the coefficient is interpreted as the marginal compensating wage corresponding to a change in the number of hours worked, *ceteris paribus*.

We found that younger and more inexperienced workers seem to have higher preferences for the informal sector. Workers who had been working on their current job for less than two years were willing to pay 102,505 COP (31.06 USD) less than their more experienced counterparts to change sectors. Additionally, although not statistically significant, age seems to influence the choice decision, as younger workers seem to be less willing to pay to switch sectors.

In terms of occupation, we found that motorcycle drivers seem to be more satisfied with their current occupation since they hold higher preferences for staying in their informal sector; their willingness to pay was 100,305 COP (30.40 USD) lower than the rest of the informal sector workers. Moreover, since there is a very high negative correlation between age and being a motorcycle-taxi driver, a group conformed mainly by young men, it may be that their age may be influencing these preferences.

As expected, it seems that workers who had a debt and were the only worker of the household appreciated more the stability of a formal job. Although not highly statistically significant, holders of debt were willing to pay around 77,044 COP (23.35 USD) higher to switch sectors, compared to those that did not have any debt. In addition, workers who were the only income source for their household were willing to pay 127,401 COP (38.61 USD) more to change to the formal sector. These workers seem to appreciate more the non-monetary related benefits of having a job with stable earnings, especially the capability of reducing their financial risk in times of crisis.

Table 2. Compensating wage differential model

Variable	Description	Model 1		Model 2		Model 3	
		Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Working hours	Difference of formal job weekly working schedule (48 hours) minus current informal job weekly working schedule	-3,110	-2.34**	-3,243	-2.46**		
Log Working hours	Logarithm of 48 minus the logarithmical transformation of current informal job weekly working schedule					-172,202	2.61***
Unique worker in the household	1 if he/she is the unique working in the household	119,256	2.75***	128,660	3.03***	127,401	3,00***
Debt	1 if has a debt	70,348	1.32	78,555	1.50	77,044	1.47
Less 2 years working	1 if he/she has been working in its current position for less than 2 years	-91,749	-1.80*	-101,300	-2.06**	-102,505	-2.09**
Married	1 if married	-135,153	-1.93*	-124,782	-1.81*	-122,858	-1.79*
Head of the house	1 if the head of the household	-143,246	-2.85***	-127,508	-2.64***	-129,959	-2.68***
Unfinished high school	1 if he/she did not graduate from high school	-92,410	-2.01**	-74,031	-1.73*	-74,117	-1.74*

Table 2 (continued). Compensating wage differential model

Variable	Description	Model 1		Model 2		Model 3	
		Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Motorcycle driver	1 if the individual is a motorcycle driver	-78,781	-1.29	-97,744	-2.26**	-100,305	-2.32**
Street vendor	1 if the individual is a street vendor	435	0.01				
Younger 35	1 if younger than 35 years old	-52,947	-0.98				
Strata 2	1 if belong to the highest reported level of socio-economic strata (Strata 2)	-4,360	-0.04				
Low family income	1 if family income is lower than 400,000 COP	64,140	1.17				
1-2 kids	1 if the individual has one or two kids	-7,713	-0.14				
3 kids or more	1 if the individual has three kids or more	29,364	0.49				
Female	1 if Female	-20,487	-0.36				
Constant	Model's constant	96,961	-1.08	73,157	1.29	84,665	1.49
Log-likelihood			-633.57		-635.01		-634.63
AIC			1301.14		1290.02		1289.26
BIC			1373.69		1332.69		1331.93
Number of individuals			527		527		527

*Coefficients are in Colombian Pesos (1 USD = 3,300 COP).

*** p-valuee<0.01, ** p-valuee<0.05, * p-valuee<0.1

Interestingly, we found that married and head of household workers derive the lowest utility for working in the formal sector. Their willingness to pay to change to the formal sector was 122,858 (37.23 USD) and 129,959 COP (39.38 USD) lower than single and not head-of-the-household workers, respectively. Additionally, more educated workers attach higher preferences for the formal sector; individuals that had completed secondary high-school education hold a willingness to pay to switch to the formal sector 74,117 COP (22.46 USD) higher than those who did not graduate from high school.

Finally, considering a constant marginal utility of leisure (Model 2), we found that informal workers were willing to pay 3,243 COP (0.98 USD) to reduce one hour of work. Nevertheless, the literature has widely documented that the marginal utility of leisure diminishes the higher the level of leisure. To account for this, we performed a logarithmical transformation to this variable (Model 3), as follow:

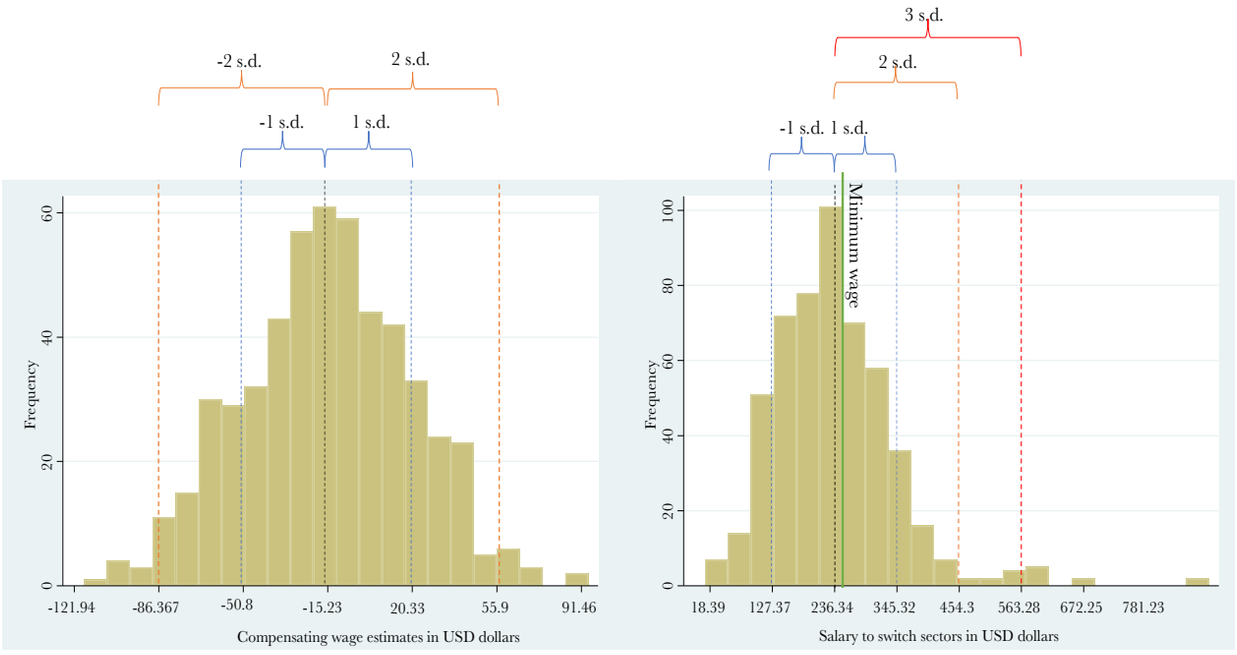
$$cw_i = \frac{\beta}{\delta}[\log(working\ hours_1) - \log(working\ hours_0)] + \frac{\alpha_1 - \alpha_0}{\delta} Z_i + \varepsilon_{i1} - \varepsilon_{i0} \qquad [6]$$

As expected, and in line with the diminishing marginal utility of leisure theory, this model is more robust and better portrays the underlying relationships as the likelihood ratio improves.

The model shows that informal workers are willing to pay 1,722 COP (0.52 USD) for a 1% decrease in the number of hours worked, *ceteris paribus*.

Finally, we also estimated the mean compensating wage (cw) of the surveyed respondents and the corresponding salary of the formal sector for which they would be willing to change sectors (w_1). On average, we found that informal workers would be willing to change to the formal sector if they were paid 50,279 COP (15.24 USD), portraying, on average, higher preferences for the informal sector. Nevertheless, the corresponding salary to which respondents would be willing to change to the formal sector is 779,937 COP (236.34 USD), slightly lower than the minimum legal wage in Colombia. Figure 1 displays the distribution of the compensating wage and formal sector job of the sample.

Figure 1. Distribution of the estimated compensating wage (left) and distribution of the formal job wage (right).



We desegregated the individual compensating wage estimates caused by the number of hours worked and socio-economic characteristics. The purpose was to understand what percentage of the compensating wage differential corresponds to differences in amenities from both sectors and what percentage corresponds to heterogeneity in individuals' characteristics regarding formal and informal job preferences. Figure 2 portrays the resulting compensating wage differentials for differences in informal and formal working hours from the sample (the distribution of $\frac{\beta}{\delta}[\log(working\ hours_1) - \log(working\ hours_0)]$ in Eq. [6] for all i). Whilst figure 3 portrays the compensating wage differential of each individual accounting only for the heterogeneity of socio-economic group's tastes (the distribution of $\frac{\alpha_1 - \alpha_0}{\delta} Z_i$ in Eq. [6] for all i).

As most of the surveyed individuals labouring in the informal sector worked more than 48 hours per week (76%, see Table A2), which is the legal maximum working schedule, individuals from the sample are willing to pay an average of 19,173 COP (5.81 USD) to reduce their workload to 48 hours. Considering this, as portrayed in Figure 3, the sample's average compensating wage differentials gets further reduced from -50,279 COP (-15.24 USD) to -69,447 COP (-21.05 USD), and the expected salary to change sectors increases from 779,937 COP (236.34 USD) to 799,128 COP (242.16 USD), a value very near to the legal monthly minimum wage. Therefore, in our study case, a reduced working schedule is one of the amenities workers value the most from the formal sector, whilst stability associated with formal jobs is less valued. In general, informal workers have higher preferences from informal sectors characteristics amenities, including a more flexible schedule, labour independence, and tax payment avoidance. It is im-

portant to remember that informal workers in Colombia attach a low value to formal sector social security schemes as they usually belong to the national subsidised health insurance regime.

Figure 2. Distribution of the estimated compensating wage (left) and the formal job wage (right) from differences in the sample's number of hours worked.

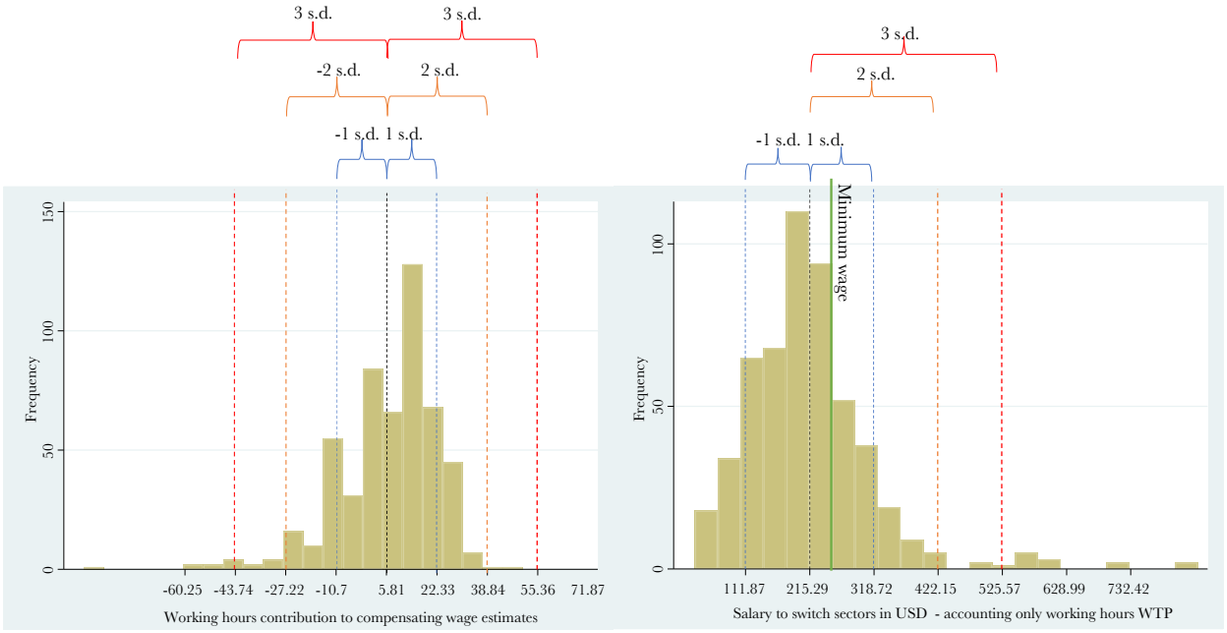
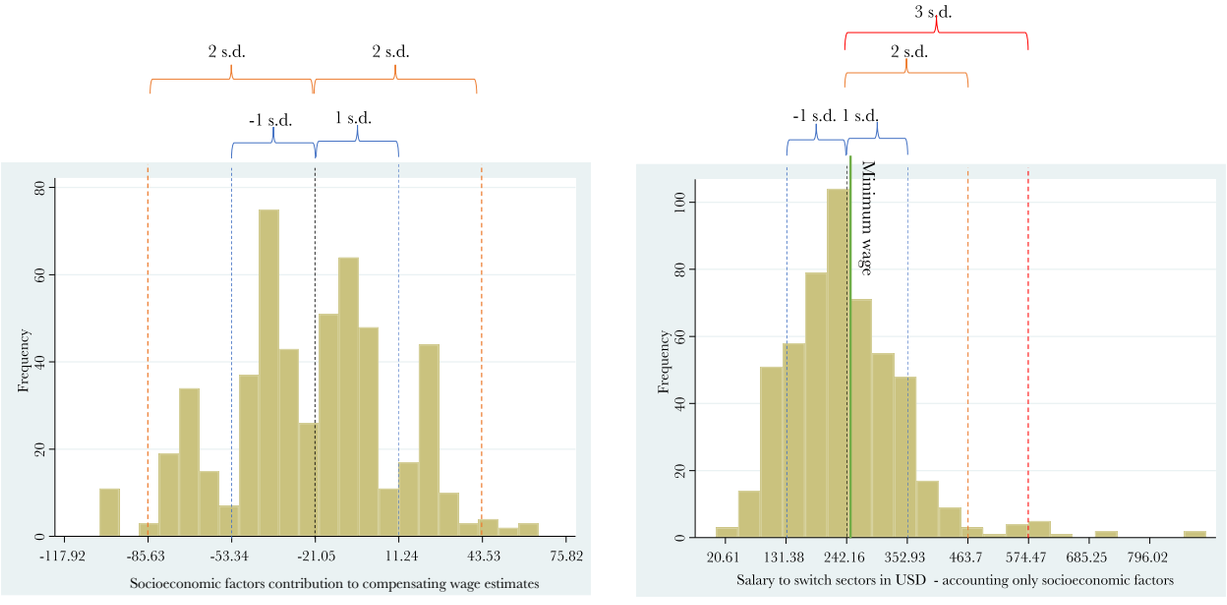


Figure 3. Distribution of the estimated compensating wage (left) and distribution of the formal job wage (right) from socio-economic characteristics of the sample.



5.3 Seeking jobs in the formal sector

After analysing what type of workers derive the highest utility from working in the formal sector, we evaluate whether the individuals who attain higher preferences of the formal sector are also the ones who are more actively seeking these opportunities. Do preferences incentivise informal workers to seek out opportunities in the formal labour market? What motivates individuals to act?

We developed a logistic model to assess the probability of informal workers looking for a job in the formal sector using the individual employee survey. The dependent variable is a dummy

that takes the value of 1 if the individual had looked for a stable job with a fixed salary and zero otherwise. Table [3] displays the coefficient estimated, together with the Average Marginal Effects of the estimates. According to the Likelihood-Ratio test, the AIC, and the BIC (Greene, 2018), model 2 has the highest goodness of fit.

As expected, workers who pay a debt and those with higher educational attainment are more likely to look for employment in the formal sector, consistent with the higher value they attach to formal job attributes, such as stability and social benefits. For this population, a stable job would reduce their financial risk in crisis times.

Table 3. Logistic regression models results. Seeking a formal job

Variable	Description	Model 1			Model 2		
		Coef.	t-stat	AME	Coef.	t-stat	AME
Female	1 if female	-0.668	-2.13**	-0.110	-0.644	-2.1**	0.048
Logarithm of age	Logarithmical transformation of age	-0.500	-1.11	-0.086	-0.435	-1.18	-0.075
High school education	1 if the maximum level of education achieved is a high school diploma	1.181	4.67***	0.211	1.210	4.91***	0.217
Tertiary education	1 if the maximum level of education achieved is a vocational training or an undergraduate degree	1.578	3.64***	0.292	1.610	3.81***	0.299
Debt	1 if has a debt	0.638	2.44**	0.114	0.619	2.40**	0.111
Daily income	Daily income of the individual in ten thousand of pesos	-0.014	-1.42	-0.002	-0.016	-1.62*	-0.003
Worked as a formal employee	1 if the individual has worked as a formal employee	1.135	4.43***	0.211	1.110	4.37***	0.207
Unique worker in the household	1 if he/she is the unique working in the household	-0.499	-2.16**	-0.086	-0.499	-2.22**	-0.086
Low family income	1 if family income is lower than 400,000 COP	0.666	2.31**	0.117	0.674	2.36**	0.119
Street vendor	1 if the individual is a street vendor	-1.386	-3.60***	-0.227	-1.281	-3.94***	-0.202
Motorcycle driver	1 if the individual is a motorcycle driver	-0.166	-0.54	-0.031			
1-2 kids	1 if the individual has one or two kids	-0.145	-0.50	-0.025			
3 kids or more	1 if the individual has three kids or more	-0.429	-1.33	-0.073	-0.339	-1.41	-0.058
Married	1 if married	0.361	0.96	0.063			
Head of the house	1 if the head of the household	-0.046	-0.18	-0.008			
Strata 2	1 if belong to the highest reported level of socio-economic strata (Strata 2)	-0.215	-0.42	-0.036			
Working hours	Number of current weekly working hours	-0.001	-0.06	-0.000			
Constant	Model's constant	1.167	0.66		0.734	0.53	
Log-likelihood		-270.255			-271.22		
AIC		578.51			566.44		
BIC		659.58			617.64		
Number of individuals		527			527		

*** p-valuee<0.01, ** p-valuee<0.05, * p-valuee<0.1

On the other hand, women are less likely to pursue a different job as formal employees. In Latin America, most women work at home or in the informal sector. On average, women face more obstacles to benefiting from labour rights. Thus, policies to reduce informality are more likely to benefit women (Bando, 2019).

Interestingly, older workers and street vendors are less likely to look for formal job opportunities despite having higher formality preferences. This finding may be a consequence of the difficulty that the elderly face in finding a job and their well-established habit of doing their current profession, making them reluctant to change or look for a job as an employee.

Results suggest that previous experiences in the formal labour market positively impact the probability of looking for a job with stable earnings, which means that those who have had the opportunity to work as formal employees would like to continue labouring in this way.

In terms of qualifications, it seems that the higher the educational level achieved by the informal worker, the more likely she/he would look for a formal job. Workers who did not end secondary school would tend to look less for formal employment as they may be aware of the difficulty of finding a decent job with their educational level. Finally, regarding their occupation at the time of the survey, the model suggests that the only statistical difference is between street vendors, who were less likely to seek opportunities to change their job.

We also inquired into whether the length of the workday, used as a proxy of job quality, influenced the decision of looking for a formal job, but this variable was not statistically significant. The same occurred when we introduced the socio-economic strata variable and the proportion of working people per home.

6. Discussion

Before discussing the results, we need to point out the limitations of the research. First, the sample collected is not representative of the whole country, as the data was gathered from a specific region of Colombia. Nevertheless, the characteristics of the Caribbean region, that is, the study region, are similar to those of less developed sectors in Latin America and the Caribbean region. Another limitation is that our empirical model does not explicitly include all the relevant job's attributes (X_S) that individuals might consider when choosing a job. Future research should address this to understand what formal sector amenities workers value the most and the least besides stability and a reduced working schedule.

Our results suggest that most informal workers are willing to switch to the formal sector only if they are offered a higher salary than their current income, although in many cases lower than the legal minimum. When estimating the wage differential, it seems that the benefits of informality (e.g., flexibility and independence, cash transfer programs, subsidised health, taxes free) are, in general, better weighted than the benefits of formality (e.g., stability, pension contribution, paid vacations).

It is worth discussing whether the monetary subsidies and welfare programs, such as the subsidised health system of Colombia and the conditional cash transfer "*familias in acción*", discourage formal employment in Colombia. Nevertheless, in the study region, lower earnings (around 80% of informal workers earn less than the minimum wage) and poor access to legal and low-interest credit are the main difficulties that informal workers face when looking to formalise their business. Some solutions might include the delivery of government subsidies and credits and reducing formalisation costs and procedures. In the case of informal self-employed workers, which are the majority in the region, a good option is lowering social security contribution rates to reduce the costs of shifting towards formality. As an example of some international

cases within this policy framework, Brazil launched the Individual Micro-Entrepreneur (MEI) program, which provided preferential social security rates and exemptions from federal taxes for independent workers. Although it has encountered some challenges, this program achieved good results lowering the informality rate and a positive reception among the citizens (Nagamine Costanzi & Duarte Barbosa, 2013).

One constraint in the formalisation process is the labour market's capacity to absorb informal workers' formal job demand. Since most informal workers in the sample earn less than the minimum wage, formalisation would necessarily be accompanied by an increase in their salaries. However, there is no certainty of whether the labour market can absorb this surplus. In fact, despite informal workers holding higher value on the informal sector's amenities, the compensating differential wage model points out that they would still be willing to change to the formal sector for a wage lower than the legal minimum. This evidences that in the Colombian labour market, there is a surplus of formal jobs demand, but the minimum wage and current market dynamics is constraining the allocation of this surplus. In this order of ideas, the legal minimum wage may be, to some extent, causing informality in Colombia as there may be firms that could absorb the surplus of formal's job demand for a salary lower than the minimum wage but higher than informal workers reservation wage to change sector. Some alternatives to overcome these limitations are the provision of subsidies to finance wages or the introduction of differential minimum wages that consider the economic situation of each region; however, these policies are associated with multiple difficulties and challenges that lower its reliability (Saget, 2001).

We also found that education level is a statistically significant driver of formality because it improves productivity and formal job creation, as well as increases individuals' preferences for formal job's benefits; highly educated individuals are willing to switch sectors even for a lower salary. Workers with debt also display higher preferences for formality and are more continually looking for employment in this sector. Educated and individuals with debt may be more aware of the benefits that formal work can provide. On the other hand, although the youth display lower preferences for formality, they tend to look more for opportunities in the formal sector than their older counterparts. We believe that older informal workers may have low optimism regarding the probability of being hired for a decent job, hindering their motivation to switch sectors. Finally, results suggest that the profile of informal workers is consistent with the characterisation of individuals' preferences for formal jobs; workers that attach the highest preferences on formality also are more likely to be formally employed.

7. Conclusion

This research assessed the wage differential that would induce workers to switch between informal and formal sectors, applied to a case study in the Colombian Caribbean region. We also analysed which socio-economic groups attain the highest value on formal job attributes and which factors increase the likelihood of seeking a formal labour market job.

Findings suggest that informal workers, on average, are willing to switch to a formal job only if they are offered a higher salary compared to their current income. The advantages of being informal (i.e., welfare programs such as cash transferences, subsidised health, and taxes free) may influence this outcome. Nevertheless, considering that the current informal worker's income is significantly low, most informal workers would be willing to switch sectors for a salary lower than the legal minimum. Results indicate that informal workers are willing to access the formal labour market as long as the wage surpasses an expected threshold, on average lower than the legal minimum salary. However, the relatively high costs related to formalisation (taxes, licenses, social security contributions, among others), and the legal minimum wage constraints workers opportunities to switch sectors. The findings of the study provide insights into the motivations, rationale, and determinants of informality. All this information could help public authorities to understand labour informality better.

The field of research on labour informality is wide. In the Colombian context, further research should address the effect of direct government subsidies to low-income families, and the liberalisation of the labour market, on informality. It is also of interest to make comparative studies that assess differences and similarities in informality determinants in the country, considering the vast regional differences. Other topics, such as informal work in minors, are also of interest.

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APPENDIX

Table A1. Household survey summary statistics of covariates used in informal worker characterisation models

Variable	Sample range/Categories	**Summary stats**		**Informality[1] stats conditional on…**		
		mean	s.d.	mean	s.d.	Sig.[2]
Gender	Male	0.6291	0.5	0.890	0.313	*
	Female	0.3709		0.846	0.361	
Age (continuous)	13 years lower limit, 85 years higher limit	41.48	13.51			
Age (Categorical)	Younger than 35 years old	0.6603	0.5	0.870	0.336	
	35 years old or older	0.3397		0.880	0.326	
Educational attainment	Unfinished high school	0.4416	0.497	0.972	0.164	***
	High school	0.4063	0.491	0.873	0.334	
	Vocational training	0.0747	0.263	0.673	0.474	
	University	0.0774	0.267	0.509	0.504	
Number of children (Continuous)	0 kids lower limit, 6 kids higher limit	1.1033	1.127			
Number of children (Categorical)	No kids			0.895	0.307	
	Has 1 or 2 kids			0.849	0.358	
	Has 3 kids or more			0.906	0.294	
Socioeconomic strata	Strata 1	0.8696	0.3	0.902	0.298	***
	Strata 2	0.1304		0.688	0.466	
Owner of car	Owner of car	0.0163	0.1	0.417	0.515	***
	Do not own a car	0.9837		0.881	0.324	
Owner of motorcycle	Owner of motorcycle	0.3682	0.5	0.827	0.379	***
	Do not own a motorcycle	0.6318		0.901	0.299	
Informality	Informal	0.8736	0.3			
	Formal	0.1264				
Number of households		471				
Number of individuals		736				

[1]Informality defined as: 1 if informal, 0 otherwise
[2]Significance tested with One-way ANOVA test
*** p-value lower than 0.01
** p-value lower than 0.05
* p-value lower than 0.1

Table A2. Individual survey summary statistics of covariates used in compensating wage and formal job seeking models.

		Summary stats		**Compensating wage[1] stats conditional on…**			**Formal job seeking[2] stats conditional on…**		
		mean	s.d.	mean	s.d.	Sig.3	mean	s.d.	Sig.3
Gender	Female	0.171	0.377	-7,303	488,278		0.233	0.425	**
	Male	0.829		-8,750	437,926		0.371	0.484	
Age (continuous)	17 years lower limit, 80 years higher limit	37.945	12.785						
Age (categorical)	younger than 35 years old	0.433	0.496	-45,022	389,044	*	0.478	0.501	***
	35 years old or older	0.567		19,694	484,907		0.247	0.432	
Educational attainment	Unfinished high school	0.444	0.497	-20,200	423,679		0.171	0.377	
	High school	0.480	0.500	11,331	465,332		0.470	0.500	***
	Tertiary education	0.076	0.265	-65,700	456,756		0.600	0.496	
Number of children	No kids	0.207	0.405	-14,630	496,007		0.349	0.479	
	Has 1 or 2 kids	0.510	0.500	-19,147	426,472		0.375	0.485	
	Has 3 kids or more	0.283	0.451	15,027	445,545		0.295	0.458	
Socioeconomic strata	Strata 1	0.954	0.209	-9,590	439,995		0.342	0.475	
	Strata 2	0.046		14,000	574,875		0.458	0.509	
Family income	Lower than 400.000 COP	0.199	0.400	64,750	401,436	*	0.410	0.494	
	Higher than 400.000 COP	0.801		-26,772	455,579		0.332	0.471	
Debt	Has debt	0.192	0.394	64,220	396,785	*	0.495	0.502	***
	Do not have a debt	0.808		-25,777	456,165		0.312	0.464	
Marriage status	Married	0.101	0.301	-5,147	436,276		0.377	0.489	
	Not married	0.899		-38,769	533,335		0.344	0.476	
Role in household	Head of household	0.729	0.445	-20,492	443,109		0.318	0.466	
	Not head of household	0.271		23,189	455,152		0.427	0.496	**
Family members working	Only 1 member of family working	0.442	0.497	60,803	461,697	***	0.288	0.454	**
	More than 1 member of family working	0.558		-62,856	427,063		0.395	0.490	
Weekly schedule (continuous)	8 hours p/week lower limit, 126 hours p/week higher limit	56.133	15.889						

Table A2 (continued). Individual survey summary statistics of covariates used in compensating wage and formal job seeking models.

		Summary stats		**Compensating wage[1] stats conditional on…**			**Formal job seeking[2] stats conditional on…**		
		mean	s.d.	mean	s.d.	Sig.3	mean	s.d.	Sig.3
Weekly schedule (categorical)	Working less than 48 hours	0.241	0.428	-100,048	446,388	***	0.386	0.489	
	Working more than 48 hours	0.759		20,699	443,042		0.335	0.473	
Occupation	Motorcycle driver	0.592	0.492	-58,494	384,352	***	0.423	0.495	***
	Street vendor	0.245	0.430	84,484	568,812		0.140	0.348	
	Other			39,341	434,407		0.384	0.489	
Current occupation experience	Less than 2 years	0.252	0.435	-89,909	380,187	**	0.436	0.498	**
	Two years of experience of more	0.748		19,121	463,989		0.317	0.466	
Monthly income	120,000 COP lower limit, 2,800,000 COP higher limit	729,658	346,746						
Monthly income	Less than minimum wage	0.662	0.473	-125,685	357,398	***	0.375	0.485	*
	Equal or higher than minimum wage	0.338		217,303	510,714		0.292	0.456	
Compensating wage (mean)	-1’208,000 lower limit, 2’000,000 higher limit	-8,503	446,433						
Formal job seeking	Has not looked for formal jobs	0.347	0.476	-34,437	425,040				
	-1’208,000 lower limit, 2’000,000 higher limit	0.652		5,538	457,602				

[1]Mean-value of compensating wage interval

[2]Formal job seeker defined as: 1 if looked for formal jobs’ opportunities, 0 otherwise

[3]Significance tested with One-way ANOVA test

*** p-value lower than 0.01

** p-value lower than 0.05

* p-value lower than 0.1

Table A3. Profile of informal workers with and without income-related variables.

Variable	Model 1		Model 2	
	Coef.	t-stat	Coef.	t-stat
Male	0.33	0.80	0.19	0.49
Logarithm of age	-3.76	-3.91	-3.63	-3.89
High school education	-2.91	-3.90	-3.10	-4.09

Table A3 (continued). Profile of informal workers with and without income-related variables.

Variable	Model 1		Model 2	
	Coef.	t-stat	Coef.	t-stat
Vocational training education	-5.21	-4.47	-5.65	-4.75
University education	-6.18	-4.91	-6.80	-5.23
Number of children	-0.52	2.18	-0.48	-2.07
Strata 2	-1.73	-2.51		
Car ownership	-3.04	-1.94		
Motorcycle ownership	-1.04	-2.18		
Constant	18.15	4.25	20.39	4.57
Log-likelihood	-192.76		-200.92	
Number of households	471			
Number of individuals	736			